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ABSTRACT

The emphasis in this annotated bibliography is on materials related to existing planning practice aimed at energy conservation. It includes sections on: (1) energy related practices in policy planning; (2) land use planning; (3) zoning; (4) subdivision control; (5) transportation planning; (6) site planning and site plan review; (7) regional planning; and (8) energy efficient housing design. Of the 114 citations in this bibliography, many are new planning agency reports and ordinance extracts. This bibliography is intended to provide practicing planners with an initial review of energy efficient planning practice and to give concrete and current examples of how energy efficient planning techniques are presently used or proposed by other planners. (Author/MR)

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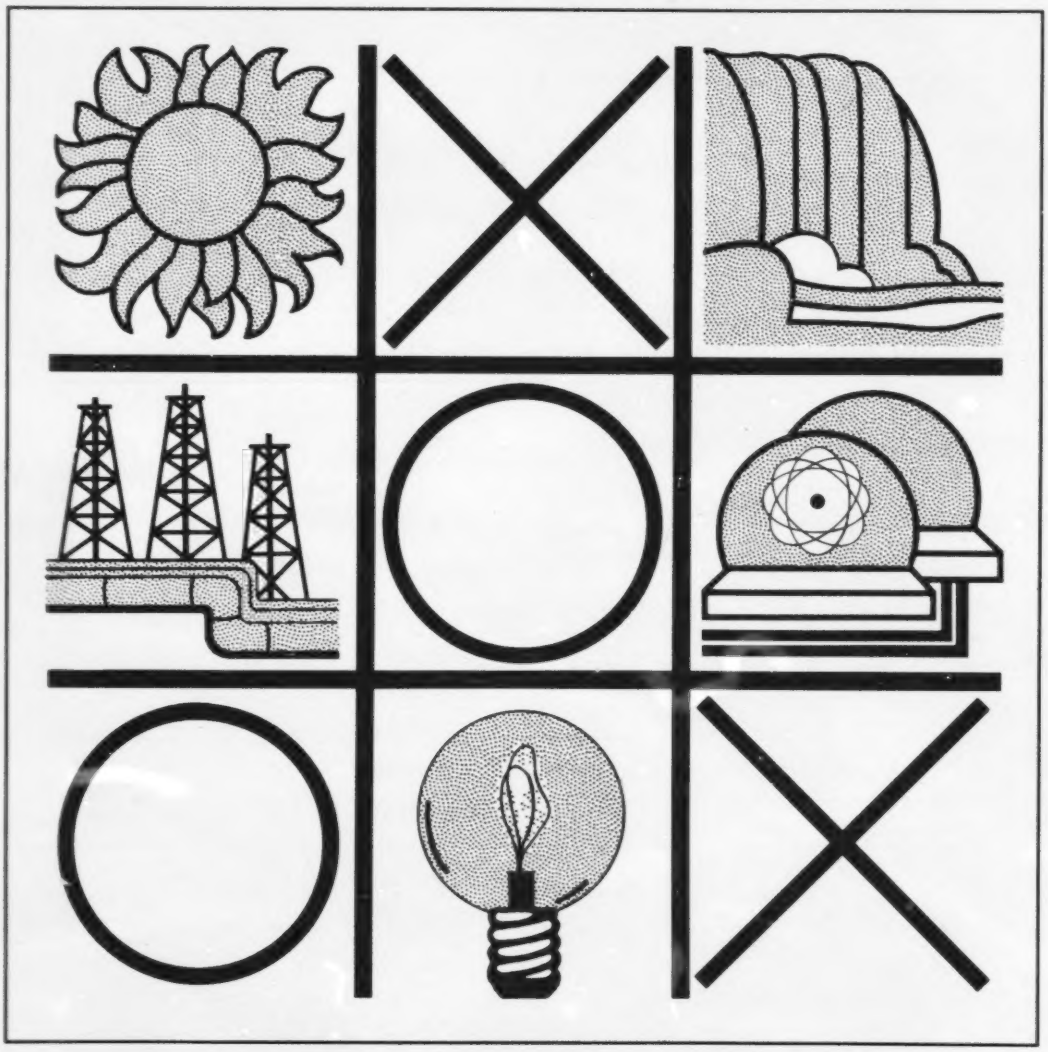
REPORT NO. 315

Planning Advisory Service

ED164308

Energy-Efficient Planning: An Annotated Bibliography

By Efraim Gil



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ENERGY-EFFICIENT PLANNING: AN ANNOTATED BIBLIOGRAPHY

By Efraim Gil

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Part 1. Introduction

The "energy crisis" has now been with us for some time, and planners have been exhorted to become more energy conscious and to promote energy conservation more actively. It has become increasingly evident that planning decisions have in the past profoundly affected the nation's energy requirements and that they will continue to do so in the future. In both the public and private sectors, planners' decisions may either impede or encourage the conservation of energy. Through such devices as the capital budget, the urban planner helps to shape the timing of development and the location of basic public facilities. Similarly, through the use of such police power devices as zoning and subdivision control, the urban planner imposes constraints that affect the energy demands resulting from development.

The purpose of this bibliography is to annotate and review practice-oriented planning literature on energy conservation. The bibliography is intended to provide practicing planners with an initial review of energy-efficient planning practice and to give concrete and current examples of how energy-efficient planning technique are presently used or proposed by other planners. The bibliography is aimed at an immediate dissemination of needed information. We anticipate publishing a more detailed report later, based in part on a comprehensive analysis of the materials covered in this bibliography.

The emphasis in the present bibliography is on existing planning practice aimed at energy conservation. It covers the breadth of planning practice and includes sections on energy-related practice in policies planning, land-use planning, zoning, subdivision control, transportation planning, site planning and site plan review, regional planning, and energy-efficient housing design.

Planners only recently have come to recognize energy efficiency as an important planning objective. Yet many traditional planning principles have indirectly promoted energy conservation: greater reliance on public transportation, clustering, mixing uses, and reducing urban sprawl, for example. As a result, a number of documents listed are not explicitly energy related; they have been included to demonstrate the range of issues and concerns that can be addressed to implement an energy-efficient strategy in urban and regional planning.

Of the 114 citations annotated in this bibliography, a large majority are new planning agency reports and ordinance extracts. Many of these reports were obtained through a request for information mailed in July 1975 to ASPO Planning Advisory Service subscriber agencies. The emphasis in this bibliography is, therefore, on the ways the planners who responded to our inquiry use existing planning principles and practices and modify presently used planning instruments and documents to promote the conservation of energy.

The address is furnished with each citation so as to facilitate easy communication with the agencies involved. It should be noted that not all available reports in any given category have been listed and that the reports cited are not necessarily the "best," although they are intended to be representative in any given category.

No reports listed in this bibliography are available from ASPO, except that Planning Advisory Service subscribers may be able to obtain a few of the reports on a loan basis from ASPO if they find that the publications no longer are available from the issuing agencies. This service is available only to Planning Advisory Service subscribers, through the PAS Inquiry-Answering Service.

Part 2. Energy Conservation and Planning—Background, Policy, and Implications

This section cites three types of material: (1) publications providing background information that, although not published by or for planners, would be of interest and use to them when attempting to include energy efficiency in the planning process; (2) materials that establish a relationship between planning and energy conservation and propose policy aimed at the achievement of energy conservation through appropriate land-use planning; and (3) publications dealing with the wider implications of energy-efficient planning for life style, for the environment, and for governmental operations.

BOOKS AND REPORTS

1. Allen, Edward H. *Handbook of Energy Policy for Local Governments.* Lexington Books, D. C. Heath and Co., 125 Spring St., Lexington, MA 02173. 1975. 236 pp. $15.

This handbook is designed to help local governments improve energy management. While aimed at the small municipality, it contains information that will be helpful to counties and to large cities as well. It offers detailed, step-by-step, practical suggestions on how to handle commonly encountered energy supply problems. It also contains information on whom to call at state and federal offices to get more petroleum, propane, or other fuels or in the event of energy emergencies. There is a series of model energy management ordinances and a discussion of the legal problems of energy management. The handbook is designed to cover three topics: the energy policy administrations at the federal and state levels; the energy policy alternatives of local government; and the basic problems of managing energy emergencies and supply disruptions. An encyclopedic index offers a comprehensive guide to the book, and there is a glossary of energy policy and related terms.

2. Brown, Theodore L. *Energy and the Environment.* Charles E. Merrill Publishing Co., 1300 Alum Creek Dr., Columbus, OH 43216. 1971. 141 pp. $3.50.

This book describes how man's generation and consumption of energy can affect the quality and character of his natural surroundings at present and in the future. An interesting book written in laymen's language, it includes much useful information.

3. Bullard, Clark W. III. *Energy in the Planner's Mind.* CAC Document #116. Center for Advanced Computation, University of Illinois, Urbana, IL 61801. May 1974. 10 pp.

This paper defines the energy impact of planners' decisions and develops a way of thinking about energy so it can be brought into consideration at every stage of the comprehensive planning process. Suggestions are offered for designing features into a community to insulate it from the instabilities of energy shortages and expected price increases.

4. Burchell, Robert W., and Listokin, David, eds. *Future Land Use: Energy, Environmental, and Legal Constraints.* Center for Urban Policy Research, Rutgers University, New Brunswick, NJ 08903. 1975. 377 pp. $17.95.

What will be the shape of our cities in the year 2000? Will energy shortages limit urban sprawl, or will the demand for new energy sources dull environmental sensitivities instead? Will the growing legal controversy over managed growth lead to an improved environment or simply to an inadequate supply of housing for all but the most affluent? And who will choose among all the alternatives? These and other questions about the character of our lives in the not-too-distant future are explored by researchers in the fields of energy, the environment, and land-use law.

5. Burg, Nan C. *Energy for the Future: A Selected Bibliography on Conservation.* Exchange Bibliography 776. Council of Planning Librarians, P.O. Box 229, Monticello, IL 61856. April 1975. 39 pp. $4.

This is a five-part, unannotated list of references, generally of a nontechnical nature. The sections are titled: General and Multi-Reference Materials; Conservation of Resources; Response to Energy Conservation Requirements; Nontechnical Reports on "Alternative" Energy Sources; Selected Bibliography on Energy. A related Council of Planning Librarians bibliography by the same author is: *Energy Crisis in the United States: A Selected Bibliography of Non-Technical Materials,* Exchange Bibliography 550, March 1974, 67 pp., $6.50.

6. Calderon, Cinda Martin, and McKenna, David. *Energy and Local Government.* Institute of Urban Studies, University of Texas at Arlington, Arlington, TX 76019. Sept. 1974. 108 pp.

This study reports the results of a statewide survey of counties and municipalities concerning the impact of the energy crisis. It suggests a number of ways in which local authorities can conserve energy and considers some of the positive and negative results of such conservation measures. Useful appendixes deal with: "How to Establish an Energy Conservation Program," "Model Directive to City (County) Employees," "Energy Conservation in Existing Buildings," "Municipal Energy Survey Form," and "County Energy Survey Form."

7. *Energy Conservation: A Report of One of a Series of National Conferences on the Conservation of Energy, Museum of Science and Industry, Chicago, Illinois, October 11, 1973.* Document No. 74-6. Robert L. Vogl and Sonia Vogl, eds. Illinois Institute for Environmental Quality, 309 W. Washington St., Chicago, IL 60606. March 1974. 25 pp. Free; supply limited.

This is a report on one of a series of national conferences on the conservation of energy made possible by a grant from the National Science Foundation. Its emphasis is on measures that can be taken now, rather than on seeking new technological solutions. The conference found that three principal areas seemed to offer the greatest potential for energy conservation: building design and maintenance, transportation, and industry and commerce.

8. *Energy Needs—A New Criterion for Planning?* Association of Bay Area Governments, Claremont Hotel, Berkeley, CA 94705. Feb. 1974. 25 pp.

Three discussion papers prepared for the ABAG General Assembly: "Planning for Energy-Efficient Communities in the San Francisco Bay Region," "New Concepts for Community Planning and Energy Use," and "Possible Regional Assistance in Energy Planning."

9. Energy Policy Project of the Ford Foundation. *A Time to Choose: America's Energy Future.* Ballinger Publishing Co., 17 Dunster St., Cambridge, MA 02138. 1974. 528 pp. $12.95; $4.95 (paperback).

This is the final report of the $4 million Energy Policy Project sponsored by the Ford Foundation. It represents the definitive summary and interpretation of the more than 25 studies commissioned by the project (see 11, 22, 110). Its authors sketch the broad outlines of the energy problem and construct scenarios to illustrate the probable outcome of three principal energy policy options—continuation of historical growth patterns; reliance upon technology to "fix" the problem; and movement toward a "Zero Energy Growth" (ZEG) policy. After examining the implications of these alternatives for such issues as employment, life styles, foreign policy, and resource availability, they are moved to conclude that ZEG is a reasonable choice. An important book.

10. Environment Information Center, Inc. *The Energy Index '74: A Select Guide to Energy Documents, Laws, and Statistics.* EIC, 124 E. 39th St., New York, NY 10016. 1974. 630 pp. $60.

This is the 1974 edition of what has now become an annual publication accompanied by an update service. As do other EIC indexes, this gives detailed abstracts on many hundreds of energy-related documents—mostly journal articles—and includes detailed price and ordering information and several useful indexes. The abstracts themselves are listed under 16 headings. The more relevant are: Energy Policy; Planning and Miscellaneous; Environmental Design; General; Land Use and Misuse; Population Trends and Demography; and Transportation.

11. Hollomon, J. Herbert, and Grenon, Michel. *Energy Research and Development Policy.* Papers prepared for the Energy Policy Project of the Ford Foundation. Ballinger Publishing Co., 17 Dunster St., Cambridge, MA 02138. 1975. 264 pp. $11; $3.50 (paperback).

Rejecting the common view that the only solution for America's current energy problems is a high-priority, federally funded research and development program, this study examines the behavior of current systems that deliver energy for consumption. The goal is to ensure that the energy sector (including the government) can and will be responsive to future needs and demands for fuel, clean air, preservation of the environment, and safety and security of supply. The authors describe the current energy supply system and various failures in the allocation of resources for research and development and then suggest criteria on which to base government intervention to correct such failures. Methods and institutional structures appropriate for intervention are described. Also included are specific suggestions for research and development with respect to energy supply and demand.

12. Macrakis, Michael C., ed. *Energy: Demand, Conservation, and Institutional Problems.* Proceedings of a conference held at the Massachusetts Institute of Tech-

nology, February 12—14, 1973. MIT Press, Cambridge, MA 02142. 1974. 556 pp. $25.

This book provides a comprehensive overview of energy problems. Two particularly interesting papers are: "Residential Demand for Electricity" and "Energy Utilization in a Residential Community."

13. Mauer, George. *The Energy Crisis and Its Impact on South Dakota.* South Dakota State Economic Opportunity Office, State Capitol Building, Pierre, SD 57501. Jan. 1975. 68 pp.

This report is based on a series of public hearings held in late 1974 on the impact of the energy crisis on South Dakota. It concludes that the problem is more one of economics than of supply and affects most those of low or fixed income. The report recommends a number of state policy changes, including taking more affirmative action both administratively and legislatively.

14. Midwestern Governors' Conference, Task Force on Midwest Energy Requirements and Environmental Protection. *Report of the Task Force to the Midwestern Governors' Conference.* Prepared by Samuel J. Tuthill, Task Force Chairman. Iowa Geological Survey, 16 W. Jefferson St., Iowa City, IA 52240. July 1974. 39 pp.

The report contains 13 general recommendations and a number of specific recommendations for action to be undertaken by the governors.

15. Morris, Deane N. *Future Energy Demand and Its Effect on the Environment.* Report No. R-1098-NSF. Prepared for the National Science Foundation. The RAND Corporation, 1700 Main St., Santa Monica, CA 90406. Sept. 1972. 46 pp. $3.

This report examines the potential environmental effects of energy consumption—resource depletion, waste concentration, landscape desecration—with emphasis placed on the role to be played by energy conservation.

16. Pauker, Guy J. *Can Land-Use Management Reduce Energy Consumption for Transportation?* Paper No. P-5241. Rand Corporation, 1700 Main St., Santa Monica, CA 90406. May 1974. 16 pp.

Discusses peoples' preferences regarding the relative location of homes, jobs, recreational amenities, and so forth, and then examines the feasibility of altering the locational arrangement of these factors in order to conserve energy.

17. Real Estate Research Corporation. *The Costs of Sprawl.* U.S. Government Printing Office, Washington, DC 20402. April 1975. Vol. 1. 278 pp. $2.90. Vol. 2. Approx. 300 pp. $3.75. Vol. 3. 16 pp. $.55.

Prepared for the Council on Environmental Quality, the Department of Housing and Urban Development, and the Environmental Protection Agency, this report develops a comprehensive and consistent set of quantitative and qualitative estimates of the environmental, economic, natural resource, psychic, and other personal and community costs associated with alternative patterns of residential land development at the neighborhood and community levels. The analysis covers a range of typical development patterns from the traditional "unplanned" single-family subdivision to the high-density "new communities."

The study, prepared by the Real Estate Research Corporation of Chicago, concentrates on assessing the costs associated with developments commonly proposed for the "urban fringe" of metropolitan areas and then determines the extent to which these costs are affected by such factors as differences in population, living area, and developed acreage among the different development types. It also includes analyses of how patterns of expenditures over time and the incidence of the costs differ among development patterns. Volume 2 is an extensive literature search.

18. Rickles, Robert, and the New York Board of Trade. *Energy in the City Environment.* Noyes Press, Noyes Building, Park Ridge, NJ 07656. 1973. 173 pp. $12.50.

This publication presents the results of a 1972 symposium that brought many interest groups together to deal with the growing energy problem. While it focuses on New York City, the problems and solutions proposed have wide applicability.

19. *State Responses to the Energy Crisis.* Council of State Governments, Iron Works Pike, Lexington, KY 40511. March 1974. 42 pp. $3.

This report is the product of the Council's Energy Project, which was funded by the Federal Energy Administration in July 1974. As a method of pulling together all of the state energy activities, the Energy Project sent questionnaires to more than 600 state officials. The questionnaire was designed to elicit descriptions of specific energy activities during the preceding year, and respondents also were requested to forward copies of energy legislation, executive orders, reports, program outlines, and other materials relating to energy policies that had been developed in response to the energy crisis. The collected reports and papers are listed in the report.

The activities described offer an insight into the nature of the energy crisis. State governments, confronted with an acute problem, responded in ways that they perceived as answering some of the questions raised by and about the energy crisis. By examining what state governments have offered as solutions to the energy crisis and why these solutions were offered, some understanding of the nature and effects of the energy crisis can be gained.

20. Theobald, P. K., et al. *Energy Resources of the United States.* Geological Survey Circular 650. Geological Survey, U.S. Department of the Interior, Washington, DC 20242. 1972. 27 pp. Single copies free.

Based on information available to the U.S. Geological Survey, this report gives estimates of the U.S. resources of coal, petroleum, natural gas, uranium, geothermal energy, and oil from oil shale.

21. U.S. Congress. House Committee on Government Operations, Conservation and Natural Resources Subcommittee. *Conservation and Efficient Use of Energy.* U.S. Government Printing Office, Washington, DC 20402. Dec. 1974. 133 pp.

This report summarizes the information and suggestions received at subcommittee hearings on policies and programs that would best foster energy conservation. It incorporates other recent information in order to present a timely assessment of national energy conservation issues. It also presents some recommendations to federal agencies regarding policies and programs that would best foster the conservation of energy, as well as some suggestions for state and local governments, business and industry, and individuals.

22. Williams, Robert H., ed. *The Energy Conservation Papers.* Papers prepared for the Energy Policy Project of the Ford Foundation. Ballinger Publishing Co., 17 Dunster St., Cambridge, MA 02138. 1975. 416 pp. $17.50; $8.95 (paperback).

This book brings together a number of articles on energy conservation resulting from research sponsored by the Ford Foundation's Energy Policy Project. (See item no. 9.) Each article considers a specific aspect of energy conservation, including ways to save energy; institutional obstacles; means for overcoming these institutional obstacles; and the compatibility of energy conservation with other environmental and social goals. Of particular interest to the planner should be the chapter dealing with energy conservation through urban transportation.

ARTICLES

23. Agle, Charles K. "The Energy Crisis and Community Planning." *Federation Planning Information Report.* New Jersey Federation of Planning Officials, 1308 Wood Valley Road, Mountainside, NJ 07092. Vol. 9, No. 2 (Summer 1974, entire issue). $2.

The author suggests ways in which planners can respond to the energy crisis through improved transportation and reducing energy demand.

24. Bacon, Edmund M. "Energy and Land Use." *Urban Land.* Urban Land Institute, 1200 18th St., N.W., Washington, DC 20036. Vol. 32, No. 7 (July-Aug. 1973). Pp. 13—16.

The author describes how energy shortages, mainly of oil, will help reshape American cities and their institutions.

25. "Can We Have All the Electicity We Want and a Decent Environment Too?" *Conservation Foundation Letter.* Conservation Foundation, 1717 Massachusetts Ave., N.W., Washington, DC 20036. March 1970 (entire issue).

A discussion of the serious conflicts between environmental quality and electric power production and transmission, and some approaches to solutions.

26. Corr, Michael, and MacLeod, Dan. "Getting It Together." *Environment.* Scientists' Institute for Public Information, 560 Trinity Ave., St. Louis, MO 63130. Vol. 14, No. 9 (Nov. 1972). Pp. 2—9.

The article considers the effect of various life styles on the consumption and conservation of energy. Its focus is a study of 12 communes and the effect of their various sharing practices on energy consumption and conservation.

27. Downs, Anthony. "Squeezing Spread City." *New York Times Magazine.* March 17, 1974. P. 38.

This article attempts to envision the likely effects of energy shortage on the future shape and development of the city, suburb, and exurb. Suggestions are made for appropriate planning responses.

28. "Energy and Land Use: A Statement by the Urban Land Institute." *Environmental Comment.* Urban Land Institute, 1200 18th St., N.W., Washington, DC 20036. Sept. 1974. Pp. 1—7.

This article is a ULI policy statement attempting to identify what planners can and should do in order to contribute effectively and to the greatest degree possible to energy conservation.

29. Franklin, Herbert M. "Will the Consciousness of Energy and Environment Create an Imploding Metropolis?" *AIA Journal.* American Institute of Architects, 1735 New York Ave., N.W., Washington, DC 20006. Aug. 1974. P. 28 ff.

Franklin examines the likelihood that the combined effects of the environmental and energy crises will produce a reversal of urban sprawl. The article identifies a number of policies and discusses their effects on the continuation of urban sprawl or on a reversal of that process.

30. Hannon, Bruce M. "An Energy Standard of Value." *Annals of the American Academy of Political and Social Science.* American Academy of Political and Social Science, 3937 Chestnut St., Philadelphia, PA 19104. Vol. 410 (Nov. 1973). Pp. 139—153. Single copy, $3.

In the U.S., value is generally measured in monetary terms. This article traces various recent concerns about the appropriateness of using the money standard as the sole common denominator under all circumstances of public policy and development decisions. Assuming that energy is a critical variable in all development decisions,

the author develops an energy flow model designed to measure development costs in BTUs in addition to measuring the money costs of such development.

31. Myhra, David. "Energy Husbandry in the Home Building Industry—A Look at a Planned Unit Development." *Public Utilities Fortnightly*. Public Utilities Reports, Inc., 1828 L St., N.W., Washington, DC 20036. March 28, 1974. Pp. 32—35.

Reporting on a Princeton University study, this article indicates that energy conservation has been a low priority for developers, financiers, and regulators of housing developments. Since the home building industry is not likely to adopt conservation measures voluntarily, more stringent controls and disclosure requirements will be needed, primarily in the area of building design.

32. Odell, Peter R. "Settlements and Energy." *PA—Planning and Administration*. (An IFHP-IULA Co-publication.) International Federation for Housing and Planning, 43 Wassenaarseweg, The Hague, Netherlands. 1975-1. Pp. 42—50.

This article analyzes the relationship between energy consumption and economic development in considering different growth rates and different settlement strategies.

33. Roberts, James S. "Energy and Land Use: Analysis of Alternative Development Patterns." *Environmental Comment*. Urban Land Institute, 1200 18th St., N.W., Washington, DC 20036. September 1975. Pp. 2—11.

The article discusses the relationship between energy and land-use patterns; presents quantified information showing the possible variations in energy consumption resulting from alternative forms of land development; speculates on what constitutes an energy-efficient land-use pattern; and shows what such a pattern will cost if implemented.

Part 3. Energy Conservation—Policy Statements

This section cites general plans, master plans, policy plans, and elements of general plans that either explicitly or implicitly define policies aimed at energy conservation. All the citations in this section are to agency reports; they are listed in alphabetical order according to the names of the jurisdictions involved.

34. Albuquerque/Bernalillo County, New Mexico. *Comprehensive Plan—Policies Plan.* (Adopted March 1975.) Albuquerque/Bernalillo County Planning Department, P.O. Box 1293, Albuquerque, NM 87103. 1975. 33 pp.

Section B.3 is the energy element. It states that the city and county will promote the efficient use and conservation of energy through a variety of land-use and transportation planning devices, including: zoning, planned unit development, clustering, alternative energy sources, higher densities in selected areas, and development coordination. In addition, a number of other policies also are aimed, in a less direct manner, at energy conservation: clustering (policy A.2.d); satellite communities (policy A.2.f.); urban centers (policy A.2.1.); mixing of land uses (policy A.5.a.); joint use of buildings (policy A.5.b.); and decentralization (policy A.5.c.).

35. Alden, Village of, New York. *Master Plan.* (Adopted 1973.) Prepared by Krehbiel, Guay, & Hall, Engineers and Planners, 1868 Niagara Falls Blvd., Tonawanda, NY 14150. 5 pp.

The master plan is aimed directly at the conservation of natural resources and indirectly at promoting the conservation of energy. Instead of allowing traditional growth patterns to spread indiscriminately throughout the community, Alden's plan preserves rural areas and restricts growth to specific areas or communities. The report is very pointed in its criticism of strip development—residential as well as commercial—and clearly illustrates alternatives such as PUD and clustering.

36. Davis, California. *A Strategy for Energy Conservation.* Prepared by and available from: Living Systems, Route 1, Box 170, Winters, CA 95694. 1974. 51 pp. $5.

The document is a proposed energy conservation and solar utilization ordinance for the city of Davis. It provides data on household energy consumption in the city; reviews the relevance of type of construction, building orientation, windows, insulation, vegetation, roof overhangs, and so forth to the conservation of energy; suggests ways of increasing the energy efficiency of existing buildings; proposes energy-efficient building standards for new buildings; provides a design for solar heating and cooling in Davis; and recommends neighborhood planning practices aimed at energy conservation.

37. Eugene, Oregon. *Metropolitan Area Plan—1990.* (Adopted 1972.) Fold-out. *Eugene Community Goals and Policies.* (Adopted 1974.) 32 pp. Eugene Planning Department, City Hall, Eugene, OR 97401.

The *Metropolitan Area 1990 General Plan* embraces a compact urban growth theme through the use of an urban service boundary beyond which public services, and therefore urbanization, are not to occur prior to 1990. Also, one of the goals of the plan addresses the prudent use of environmental resources.

The *Eugene Community Goals and Policies,* adopted in 1974 within the context of the *Metropolitan Area 1990 Plan* but specifically for the city of Eugene, contains direct references to energy conservation.

38. Evanston, Illinois. *Energy Policies—Comprehensive General Plan.* City of Evanston, Municipal Building, 1501 Oak Ave., Evanston, IL 60204. March 1975. 15 pp.

In November 1974 the city of Evanston adopted an amendment to its general plan. Policies included consideration of energy efficiency in the design of public buildings and the consideration of a performance-based energy-consumption standard for new buildings.

39. Florida, State of. Pozzo, Robert J., and Clarke, James. *A Planner's Handbook on Energy (With Emphasis on Residential Uses.)* Florida Department of Administration, State Energy Office, 108 Collins Building, Tallahassee, FL 32304. 1975. 270 pp. $4.50.

The idea for this report originated as a result of

questions asked of the Energy Data Center by planners in the Florida Division of State Planning. Most of the questions were related to the energy consumption in the home and the energy impact of DRI's (developments of regional impact). However, also evident from these questions was the desire on the part of the planners to get the basic facts on energy in order to do their job better. This report was written to provide planners with both the specific data they requested concerning residential energy consumption and general background data on the subject of energy. It was written as a handbook and includes a large appendix with additional background data.

Selected chapter headings are: Preliminary Considerations Affecting Energy Consumption in a Single-Family Dwelling; Direct Energy Consumption in a Single-Family House; Transportation to and from the Residence; Residential Energy—Facts and Figures; Options, Attitudes, Commitment, and Legislative Alternatives; Pollution, Waste, and Land Use; Energy, Growth, Population, and the Environment; Conclusion; Appendix; Bibliography.

40. Forsyth County/City of Winston-Salem, North Carolina. *Selection of a Future Urban Form for Forsyth County, North Carolina.* Forsyth County/Winston-Salem Planning Board, Winston-Salem, NC 27101. April 1975. 28 pp.

This report proposes an urban services district, or urban containment policy, as a long-range plan to limit scatteration and minimize travel distances, and, by increasing densities in this low-density community, to maximize use of public transportation. The conservation of energy is one of the major factors underlying the recommendations for the urban services district.

41. Honolulu, Hawaii. *Planning for Oahu—Proposed Objectives and Policies for the Revised General Plan.* March 1974. 159 pp. *Planning for Oahu—Transportation Analysis.* March 1974. 290 pp. Department of General Planning, City and County of Honolulu, 650 S. King St., Honolulu, HI 96813.

The basic method of addressing energy conservation matters in this proposed revision of the general plan is to define residential alternatives initially and then to evaluate the various impacts that would be generated by each alternative. Included as part of the impact analysis is a transportation cost-effectiveness comparison among the alternatives. One important set of parameters that contributed to the analysis was an estimate of the amount of fuel which would be consumed under each alternative. Not only did these estimates contribute to the selection of a recommended residential alternative, but they also significantly influenced the selection of an "intensive transit" transportation policy.

42. Indio, California. *General Policies and Development Plan—Energy Conservation Element (Proposed).* Indio Planning and Development Department, 45-250 Towne St., Indio, CA 92201. [1975]. 8 pp.

This is a proposed energy policy statement to be incorporated into the general plan. Its purpose is to identify and promote technical achievements and architectural and site planning techniques and to develop regulations that will help conserve energy. In addition to objectives and policies, programs and standards are included to help guide development decisions.

43. Lincoln—Lancaster County, Nebraska. *Energy Utilization Element—Goals and Policies Review (Proposed).* Lincoln City—Lancaster County Planning Department, 555 S. Tenth St., Lincoln, NE 68508. [1975.] 4 pp.

This proposal outlines a number of land-use, transportation, community facilities, and building design policies aimed at the conservation of energy. Included are policies calling for locating residential facilities closer to employment centers; mixed residential and nonresidential uses; microclimate consideration in site planning; encouragement of mass transit; staggered work hours; revision of building codes; and the encouragement of alternate energy sources.

44. Maine, State of. *Interim Energy Policy and Comprehensive Energy Plan for the State of Maine: Report to the 107th Legislature.* Maine Office of Energy Resources, State Office Building, Augusta, ME 04330. Jan. 1975. 55 pp.

This report discusses a series of policies aimed at energy conservation and provides a comprehensive energy plan. Among other issues, the plan also deals with such planning and land-use questions as procedures for siting energy facilities, the location of heavy industrial facilities, state loans for residential insulation, statewide energy conservation standards, and alternate energy sources.

45. Oregon, State of. *State Wide Planning Goals and Guidelines.* (To become operative January 1976.) Oregon Land Conservation Development Commission, 1175 Court St., N.E., Salem, OR 97310.

Goal No. 13 and its accompanying guidelines are aimed at energy conservation.

46. San Diego, California. *General Plan: Energy Conservation Element.* (Adopted July 17, 1975.) San Diego Planning Department, City Administration Building, 202 "C" St., San Diego, CA 92101. 13 pp.

The Energy Conservation Element emphasizes three areas: demand and supply; utilization; and conservation. It also includes considerations of certain energy conservation features of waste disposal.

47. Wichita Falls, Texas. *General Plan.* (Adopted 1973.) Wichita Falls Planning Department, P.O. Box 1431, Wichita Falls, TX 76307.

The plan establishes a policy of utilization of existing vacant land resources within the city.

Part 4. Zoning and Subdivision Controls

This section cites sample or model legislation, suggested action, or administrative procedures aimed at some of the following energy-conserving land-use-control options: emphasis on planned unit development; increased density while preserving amenities; mixed-use zoning aimed at shorter travel distance; location of convenience shopping within walking distance; the requirement of energy impact statements; subdivision layout that would result in shorter travel distances; street orientation in relation to climatic conditions and eliminating obstructions to solar heating or generation units. The listings again are alphabetized according to the name of the jurisdiction.

48. Albuquerque/Bernalillo County, New Mexico. *Comprehensive City Zoning Code—Proposed General Revision.* Albuquerque/Bernalillo County Planning Department, P.O. Box 1293, Albuquerque, NM 87103. May 1975. 6 pp.

A proposed setback residential zone (R-D) for use in developing areas eliminates setback requirements and encourages clustered residential development. High densities are to be clustered within urban centers. The proposed ordinance specifically addresses solar energy in requiring that no building can shade adjacent property from solar access.

49. Baltimore County, Maryland. *Proposed Zoning Amendments: Zoning Classifications for Resource Conservation.* Baltimore County Office of Planning and Zoning, 105 W. Chesapeake Ave., Towson, MD 21204. June 1975. 36 pp.

The proposed resource conservation zones aim at the conservation of resources, including that of energy, through measures designed to control sprawl and protect the rural portion of the county.

50. California, State of. *The 1974 Amendment to the California Environmental Quality Act. The 1975 State Guidelines for the Implementation of the California Environmental Quality Act.* 85 pp. Secretary for Resources, The Resources Agency, 1416 Ninth St., Sacramento, CA 95814.

According to this amendment and the state guidelines, all planning proposals must include energy-consumption conservation impact statements as part of the more general environmental impact report.

51. Eugene, Oregon. *Eugene Code. Section 9.550—Cluster Subdivision in RA and R-1 Districts.* (Ordinance No. 17145, enacted August 12, 1974.) Eugene Planning Department, City Hall, Eugene, OR 97401. 1 p.

Lot area, lot coverage, and yard requirements are relaxed under certain conditions in RA and R-1 districts, so as to create clustering in new subdivisions. This allows for subdivisions and planned unit developments of up to 8.03 units per acre in single-family zones that otherwise require 6,000 square feet of lot area per dwelling unit. Mathematically, this works out to be a 10 per cent bonus; but, considering that the average subdivision usually can be constructed at no more than four units per acre including streets, this approach offers a significant advantage.

52. Forsyth County/City of Winston-Salem, North Carolina. *Agricultural Zoning—Proposed R-9 Acreage Zoning and Supplementary Methods for Guiding Development into an Urban Services District.* Forsyth County/City of Winston-Salem Planning Board, Winston-Salem, NC 27101. April 1975. 103 pp.

The document proposes a number of land-use-control and development guidance measures aimed at imple-

menting an urban containment policy through the creation of an Urban Services District. Among the methods proposed are: agricultural zoning, large acreage zoning, natural resources planning, needs planning, public information services, thoroughfare planning as a development guidance tool, subdivision design assistance, subdivision review, site plan review, environmental impact review, a "staged development" map, "201" sewerage facilities plan, water and sewer extension schedules, preferential tax valuation, and a capital gains tax on conversion of land. Others included are: requiring developers to extend main lines at their own expense; withholding urban public services; provision of urban public services; "benefit assessment" to land tributary to water and sewer extensions; tax valuation on improved land based in part on provision of water and sewer services and zoning for more intensive use; sliding rate scale for water and sewerage based on distance from treatment plant and density of development.

53. Idaho, State of. *Zoning Regulation Guidelines for Cities and Counties.* 1975. 77 pp. *Subdivision Regulation Guidelines for Cities and Counties.* 1975. 38 pp. Idaho State Division of Budget, Policy Planning, and Coordination, Boise, ID 83720.

Both documents have extensive PUD provisions aimed explicity at a more efficient use of land, shorter utility lines, and shorter streets—all important ingredients in the design of an energy-efficient environment.

54. Los Alamos County, New Mexico. *Zoning Ordinance, 1975 Revision.* (Proposed.) *Subdivision Regulations, 1975 Revision.* (Proposed.) Los Alamos County, 2300 Trinity Drive, Los Alamos, NM 87544.

The above are early proposals that include measures to encourage a very flexible planned development concept aimed at the containment of sprawl. The intent is to encourage cluster development, in order to reduce the extremely high construction costs prevalent in the area and to help alleviate utility problems and costs, which are also a contributing factor in energy conservation. Plan review and approval is required of most developments, with energy and resource conservation a prime criteria of consideration.

55. Pequannock Township, New Jersey. *Zoning Ordinance.* (1975 Revision.) Township of Pequannock, 530 Newark-Pompton Turnpike, Pompton, NJ 07444.

Pequannock Township, in implementing a portion of its master plan, has recently adopted a modest cluster zone and has approved the construction of up to four dwelling units per building in the business centers of the township. Further revisions will enable the construction of multifamily housing in areas served by mass transit and adjacent to business centers; the construction of two-family houses along major local traffic arteries served by mass transit; and additional cluster ordinances, including a planned residential development.

56. San Francisco, California. *Format and Guidelines for Material Required for a Draft Environmental Impact Report.* San Francisco Department of City Planning, 100 Larkin St., San Francisco, CA 94102. April 1975. 9 pp.

The Environmental Review Officer supervises the review of projects subject to environmental evaluation per state regulations under the California Environmental Quality Act (CEQA). The San Francisco Administrative Code provides more stringent requirements for reporting of energy impacts than are mandatory under CEQA. Section V of the guidelines, Mitigation, requires a discussion of design measures to mitigate energy consumption in operation of the project. Energy resources are also included under the use of nonrenewable resources in Section IX.

57. San Jose, California. *Zoning Ordinance.* San Jose City Planning Department, City Hall, San Jose, CA 95110.

Clustering and the planned unit development process are used to encourage higher densities that generally reduce energy requirements for heating and lighting in these developments. The planning staff in San Jose found a dramatic reduction in vehicle use in those PUDs that tend to be self-supporting, i.e., where social, recreation, food, and health facilities are provided.

58. Tuxedo, New York. *Proposed Zoning Local Law.* (Adopted May 14, 1975.) Prepared by Manuel S. Emanuel Associates, Inc., 50 Piermont Ave., Nyack, NY 10960. 5 pp.

One approach to the reduction of energy consumption in suburban housing is clustering and planned unit development. Such procedures usually are permissive, since state legislation limits the affirmative design authority of local planning commissions. An amendment to the zoning regulations provides for separate control over density and minimum lot size to produce a de facto mandatory clustering system. Additionally, the planned integrated development regulations provide for transfer of development rights from certain high resource cost areas (R-1 districts) to sites of planned integrated development.

Part 5. Energy Conservation Through Transportation/Land-Use Planning

This section cites studies and plans aimed at energy conservation via coordinated transportation/land-use planning; the planning of land uses along public transportation corridors; the design of alternate energy-conserving modes of public transportation; the design of bikeways and walkways; the discouragement of CBD parking; the design and application of car-pooling systems; the designation of special lanes for buses; and alternate designs for airport development.

59. Bay Area, California. *The Impact of Energy Availability on Airport Planning.* Background Paper No. 1, Regional Airport Plan Update Program, Phase I. Walter E. Gillfillan. Metropolitan Transportation Commission, Association of Bay Area Governments, Hotel Claremont, Berkeley, CA 94705. July 1975. 26 pp.

Estimates of existing transportation energy requirements show airline travel to be the most energy-intensive means, compared to the bus, rail, end automobile modes. In an era of energy scarcity, there will probably be changes in the way that aviation uses energy. How these changes might affect Bay Area airport planning is the topic of this paper.

60. Berks County, Pennsylvania. *Berks County Car-/Bus-Pool Program—Final Report.* Berks County Planning Commission, Court House, Reading, PA 19601. May 1975. 10 pp.

This is the final report on the Berks County car-/bus-pool pilot program initiated as part of the Emergency Highway Energy Conservation Act. The program included bus and car pooling; the removal of parking from some CBD streets; the establishment of bicycle lanes; improvement in traffic control devices; and the study and formulation of a system for reduced parking rates in public garages for car-pool autos, motorcycles, and bicycles.

61. Capital District, New York. *Preliminary Regional Development Plan: A Consultation Document.* Capital District Regional Planning Commission, Executive Park Tower, Stuyvesant Plaza, Albany, NY 12203. March 1975. Var. pag.

An objective of this plan is a reduction in energy consumption through more efficient use of the transportation system and by providing more compact development patterns. In turn, this will reduce the rates of increase in per capita travel time, vehicle miles, and number of trips and at the same time increase the use of public transportation. A doubling of transit use is projected (from the current level of three per cent of all trips to six per cent by the year 2000). Also projected are an 11 per cent increase in gasoline consumption between 1973 and 2000 (587,000 gallons/day to 654,000 gallons/day) and a 21 per cent increase in vehicle miles traveled (7.6 million per day to 9.2 million per day). The regional development plan also advocates an in-fill concept intended to promote greater utilization of land within the existing urbanized area.

62. Central Virginia Planning District, Virginia. *Computeride.* Central Virginia Planning District Commission, P.O. Box 2526, Lynchburg, VA 24501. 1974.

Early in 1974, in the face of decreasing gasoline supplies and increasing fuel costs, the Central Virginia Planning District Commission was instructed to provide district citizens with an alternative to their current commuting patterns. These alternatives include car/van/bus pools, fringe area parking lots, improved public transit services, and so forth. However, the initial focus of the project has shifted from one of energy conservation to that of providing multimodal, citizen-responsive transportation facilities. The project serves the 166,000 residents of the Central Virginia Planning District, which includes the cities of Lynchburg and Bedford and the counties of Amherst, Appomattox, Bedford, and Campbell.

63. Dunwoody, J. Ernest, et al. "Urban Bus-Car Substitution: Dollar, Energy, and Labor Impact." Document No. 98. Center for Advanced Computation, University

of Illinois, Urbana, IL 61801.

The direct and indirect dollar, energy, and labor costs of the average urban bus and car are calculated. The net costs are determined for prescribed transfers from cars to buses. Schemes for detecting the impacts of re-spending any dollar savings are examined. The model is statistically based to allow impact calculations of changes in any particular bus system or of car operation in any particular city.

64. DuPage County, Illinois. *Optimal Land-Use Planning at DuPage County, Illinois.* DuPage County Regional Planning Commission, 421 N. County Farm Road, Wheaton, IL 60187. 20 pp.

An optimizing model for comprehensive land-use planning (OPTPLAN) is included. Multiple objectives and constraints on desired growth patterns are considered simultaneously in arriving at optimal acreages of 10 land-use types in several regions within a county or city. Objectives are minimization of conflict between different land uses; minimization of travel distance of new trips to the existing transportation network; generation of a fiscally sound plan; and minimization of environmental impact. Constraints are on each type of land use, based on population and employment projections; projected mix of residential dwelling units; local commercial and institutional land needed per thousand persons; location and extent of new industries; open space requirements per thousand population; and natural resource considerations. Application of the model to DuPage County is shown.

65. Henrico County, Virginia. *Land Use Plan: Phasing Plan.* Henrico County Planning Department, P.O. Box 27032, Richmond, VA 23273. 1975.

Even though the major focus in the preparation of the recently adopted land-use plan was not on energy conservation, land-use controls established in the plan, particularly in the phasing plan, promote the conservation of energy because of their emphasis on concentrating growth adjoining developed areas. In addition, the plan provides a variety of densities that are likely to encourage clustering and result in energy savings.

66. Hirst, Eric. "Transportation Energy Use and Conservation Potential." *Bulletin of the Atomic Scientists,* Vol. 29, No. 9 (November 1973). Pp. 36—42.

With transportation consuming about one-fourth of the total U.S. energy budget and growing rapidly, alternate forms of transporting people and goods need to be emphasized and appropriate government policy enacted and implemented.

67. Lincoln—Lancaster County, Nebraska. *Work Paper Four—Generalized Land-Use and Transportation Plans.* Prepared by Barton-Aschman Associates, Inc., Evanston, Ill. Lincoln City—Lancaster County Planning Department, 555 S. 10th St., Lincoln, NE 68508. Oct. 1974. 22 pp.

The work paper shows three alternate land-use plans that were evaluated, with an explanation of each. Alternate "C" was developed in response to energy considerations, with a compact form of development and a higher modal split than on the other two alternates.

68. Lincoln—Lancaster County, Nebraska. *Preliminary Preferred Land-Use Plan.* Prepared by Barton-Aschman Associates, Inc., Evanston, Ill. Lincoln City—Lancaster County Planning Department, 555 S. 10th St., Lincoln, NE 68508. 13 pp.

As a result of the evaluations on the alternate land-use plans, a "preliminary preferred" land-use plan has been developed. This work is presently proceeding on further detailed evaluation and refinement of this plan along with the development of transportation plan alternates.

69. Lincoln—Lancaster County, Nebraska. *Transit Development Program.* Prepared by AMV—Alan M. Voorhees & Associates, Inc., McLean, Va. Lincoln City—Lancaster County Planning Department, 555 S. 10th St., Lincoln, NE 68508. June 1975. 194 pp.

This transit plan contains an energy section recommending a number of policies and actions to be taken by the city's transit authority in case of severe limitations on private car usage because of gasoline shortages.

70. Madison County, New York. *Madison County Plans.* Madison County Office Building, Wampsville, NY 13163. March 1974. 51 pp.

This document presents alternate land-use development plans for the county.

71. Madison County, New York. *Plans Evaluation.* Madison County Office Building, Wampsville, NY 13163. March 1975. 62 pp.

This report evaluates the different plans and chooses the "Accent on Community" plan that emphasizes the energy-saving concept of consolidated community facilities, compact villages, and a more efficient transportation system.

72. Madison, Wisconsin. *Objectives and Policies: Proposals for Public Discussion, First Revision.* Madison City Planning Department, City-County Building, 210 Monona Ave., Madison, WI 53709. Jan. 1975. 44 pp.

The proposals relate growth, land use, and energy-efficient transportation on an overall policy level.

73. Maryland—National Capital Area. *Towards a Reduction in Air Pollution, Traffic Congestion, and Energy Consumption: Staff Analysis of Car Pooling.* Environmental Planning Monograph No. 3. Robert G. Perina. Maryland—National Capital Park and Planning Commission, 8787 Georgia Ave., Silver Spring, MD 20907. Nov. 1973. 21 pp.

This paper outlines some of the benefits of car pooling and documents primary and secondary effects of a successful program in terms of air pollution and gasoline consumption. Published during the 1973 gasoline crisis, it reviews several successful car-pool programs and lists elements necessary for the success of such programs.

74. Maryland—National Capital Area. *A Major Environmental and Energy Conservation Opportunity.* Environmental Plannning Monograph No. 2. Edward M. Grenning. Maryland—National Capital Park and Planning Commission, 8787 Georgia Ave., Silver Spring, MD 20907. Oct. 1973. 13 pp.

This report recommends the conversion of the agency's large vehicle fleet to dual fuel operation, with methane as the primary fuel, and reliance for its fuel supply on the unused methane being produced by the digesters used in municipal sewage treatment. Redesigning existing plants and designing new ones to help meet fuel needs can be an effective energy-conservation program.

75. McChesney, Don, and Voorhees, Alan M. "Energy Efficiencies of Urban Passenger Transportation." *AMV Tech Notes.* Alan M. Voorhees & Associates, Inc., 7798 Old Springhouse Road, McLean, VA 22101. Vol. 1, No. 15 (June 15, 1974). 13 pp.

The outlook for the short term—the next five years—is for severe shortages of energy, particularly in the petroleum products required for transportation. For the long term, the prospect for sufficient new energy supplies is more promising. However, the inescapable fact is that the days of abundant, inexpensive fuel are past; and our future life style may depend on how well we conserve and utilize our limited energy resources. This article reports on a study of the magnitude of likely shortages and the energy consumption associated with various modes of urban transportation.

76. Mid-Ohio Region, Ohio. *Preferential Bus/Carpool Lanes in the North Corridor, Columbus, Ohio—A Feasibility Study.* Mid-Ohio Regional Planning Commission, 514 S. High St., Columbus, OH 43215. August 1974. 52 pp.

During the summer of 1974, MORPC was involved in a project to investigate and offer options for conserving energy relative to the Emergency Energy Conservation Act of 1974. The major task of the project was to study the feasibility of implementing preferential bus-car-pool lanes on the North Freeway (I-71) in Columbus, Ohio. This report describes the project concept, the setting from which it evolved, the various alternatives studied, and the detailed cost/benefit analysis of the two major alternatives in comparison with the present status.

77. Nassau-Suffolk Region, New York. *Nassau-Suffolk Comprehensive Development Plan.* Nassau-Suffolk Regional Planning Board, Veterans Memorial Highway, Hauppauge, Long Island, NY 11787. 1970. Fold-out.

The plan recommends a number of projects that could alleviate problems associated with energy conservation. For example, the basic plan recommends corridors, clusters, and centers. The corridors are a series of major activity areas in the middle of Long Island that would concentrate the major traffic-generating facilities close to each other and thus allow them to be served by mass transportation. The clusters concept is a strong recommendation for using clustering in virtually all new developments. This has been very successful in most of the newly developed portions of Suffolk County. Clustering to allow planned unit developments is also being looked upon in a more favorable light. The centers concept was an early recognition that other activity areas having utilities, transportation facilities, and existing structures must be retained, rebuilt, or otherwise improved so as to remain viable, central points. More extensive use of these centers means less use of new land and, therefore, a greater concentration of activities that, in turn, can lead to more use of mass transportation and less reliance on the private automobile.

78. North Central Region, Texas. *The Total Transportation Plan for the North Central Texas Region 1990 (Executive Summary).* 1974. 18 pp.

Barker, William G. *Forecasting Urban Transportation Energy Consumption.* North Central Texas Council of Governments, P.O. Drawer COG, Arlington, TX 76011. April 1975. 28 pp.

The transportation plan contains an investigation of long-range transportation energy consumption. The paper explores the methods and results of the long-range transportation energy forecasting done as part of the 1990 plan formulation.

79. San Leandro, California. *Air Quality Related Land-Use Policies.* San Leandro Community Development Office, Civic Center, San Leandro, CA 94577. Dec. 1974. 19 pp.

The plan proposes methods of gradually modifying the land-use pattern of this community and the public transportation facilities that serve it to achieve major reductions in vehicle-miles traveled over time in order to reduce emission of air contaminants and the consumption of petroleum derivative fuels.

80. Sebald, Anthony, and Herendeen, Robert A. "The Dollar, Energy, and Employment Impacts of Air, Rail, and Automobile Passenger Transportation." Document No. 96. Center for Advanced Computation, University of Illinois, Urbana, IL 61801. Sept. 1974. [Revised version reprinted in (22) Williams, Robert H., ed. *The Energy Conservation Papers.* Pp. 105—130.]

Dollar cost and total energy and employment impacts of the three modes for intercity travel are compared for 1963 and 1971. "Impact" includes indirect as well as direct effects. Results are given on a passenger-mile basis and for three specific trips of 200 to 400 miles in length.

81. Shreve Area, Louisiana. *Carpools Action Plan.* Shreve Area Council of Governments, P.O. Box 1109, Shreveport, LA 71130. May 1975. 68 pp.

This study was initiated in 1974 because of rising concern for energy conservation. It was aimed primarily at car-pooling possibilities, but also addressed energy-related matters such as mass transit, fringe parking lots, traffic-light synchronization, and intersection improvements.

82. U.S. Department of Transportation, Urban Mass Transportation Administration. *Guidelines to Reduce Energy Consumption Through Transportation Actions.* Prepared by Alan M. Voorhees & Associates, Inc. May 1974. Available through National Technical Information Service, Springfield, VA 22151. Order No. PB 235-983/AS. $5.75.

This document is intended to serve as an aid to local transportation planners, traffic engineers, and administrators in the incorporation of energy-conservation considerations into the transportation planning process, especially in reference to short-range transportation planning. Various types of low-cost short-term transportation actions are summarized, and their potential for reducing energy consumption is estimated. Interrelationships among the energy-consumption reduction potentials of groups of actions are discussed, and a process for formulation of coherent packages of such actions is presented. This process takes into account both interrelationships and critieria that may be important to local planners, engineers, and officials.

83. Virginia, State of. *The Implications of the Energy Crisis on Virginia's Highway Safety Program.* Prepared for Virginia Highway Safety Division. Alan M. Voorhees & Associates, Inc., Westgate Research Park, McLean, VA 22101. Aug. 1974. 42 pp.

This report was prepared to identify two types of highway safety issues: issues that developed during the four-month energy crisis, and issues that could also arise during a period when sustained action is instituted to conserve energy (particularly gasoline) in Virginia. Suggestions are then made with respect to how the Highway Safety Division's program and activities could be modified to reflect increasing concern for energy conservation.

84. Wisconsin, State of. *A Model of Transportation Energy Use in Wisconsin.* M.A. Caruso et al. Energy Systems and Policy Research Group, Institute for Environmental Studies, University of Wisconsin, Madison, WI 53706. April 1975. 17 pp.

One focal point of this research is the development of a regional energy model for the state of Wisconsin. The model treats the state's energy system within a multidimensional framework that describes energy demand, conversion, transport and usage, also taking into account technological, economic, and environmental considerations. In general terms, it consists of a computerized collection of data and information about energy flow in Wisconsin, written in mathematical forms that describe or simulate the energy system and its relationship to other characteristics of the state. From another perspective, the model can be viewed as a large energy information system, designed to provide guidance for a wide range of energy-related decisions faced by individuals and institutions in government, in the private sector, and in the public at large.

Part 6. Energy Conservation Through Regional Planning

This section cites documents that assess present and future regional energy sources and demands, explore alternative regional land-use patterns in terms of energy conservation, and suggest the location of various land uses in regional frameworks as they relate to energy conservation.

85. Albuquerque—Bernalillo County, New Mexico. *Report of the Natural Resources—Energy Citizen Task Force.* 701 Comprehensive Planning Program Report No. 2. Albuquerque—Bernalillo County Planning Department, P.O. Box 1293, Albuquerque, NM 87103. July 1973. 11 pp.

The report analyzes energy supply and demand for the county.

86. Baltimore Region, Maryland. *Impact of the Energy Crisis on Travel in the Baltimore Region During 1974.* Baltimore Regional Planning Council, 701 St. Paul St., Baltimore MD 21202. March 1973. 24 pp.

This report describes an analysis of the impact of the energy crisis on travel in the Baltimore region during 1974. The analysis was undertaken to identify and document changes in travel resulting from the fuel shortages and higher gasoline prices experienced then and the implications of these changes on transportation planning.

87. California, State of. *Preliminary Coastal Plan (Hearing Draft).* California Coastal Zone Conservation Commission, 1540 Market St., San Francisco, CA 94102. March 1975. 385 pp.

The plan analyzes California's coastal resources and their meaning to both the present and future inhabitants of the state. It then develops a program for the balanced use of the coast with emphasis on environmental control and energy conservation.

88. Camden County, New Jersey. *Some Aspects of Energy Consumption in Camden County, New Jersey.* Camden County Department of Planning, 2276 N. 43rd St., Pennsauken, NJ 08110. Aug. 1975. 20 pp.

The object of this study was to draw a rough sketch of the energy consumption picture in Camden County and to make some estimates of what it would look like in the near future.

89. Central Naugatuck Valley, Connecticut. *Energy: 1975.* Central Naugatuck Valley Regional Planning Agency, 20 E. Main St., Waterbury, CT 06702. July 1975. 28 pp.

This report presents an analysis of energy consumption by fuel types within the Central Naugatuck Valley region. The tables present information on trends in the use of residential fuels; number of customers using gas and electricity in the region; energy use by income level, and energy use by sectors of the economy. Data contained in the tables include U.S. Census statistics, Connecticut Light and Power Company and Public Utilities Commission data, and information from other sources.

90. Florida, State of. Carter, Luther J. "Florida: An Energy Policy Emerges in a Growth State." *Science,* Vol. 184 (April 19, 1974). Pp. 302—5.

This article describes the process of preparing an energy policy for Florida. It concludes that the most meaningful action may be to restrain the rising demand for energy through sensible growth policies.

91. Long Island, New York. *Proceedings of the Seminar on Energy Alternatives for Long Island, May 13, 1974.* Regional Marine Resources Council, Nassau-Suffolk Regional Planning Board, Veterans Memorial Highway, Hauppauge, Long Island, NY 11787. May 1974. 124 pp.

This report examines energy production and consumption patterns in the state and provides recommendations on various issues connected with statewide energy conservation.

92. New Jersey, State of. *Energy*. New Jersey Governor's Task Force on Energy, State Energy Office, 429 E. State St., Trenton, NJ 08625. May 1974. 118 pp.

This report describes the energy supply and consumption flows of the state; analyzes the power of New Jersey to affect and control an uninterrupted flow of adequate energy; examines the prospects for developing new energy sources; defines the appropriate relationship between the state and the federal government; and develops an approach for immediate and long-term energy conservation.

93. New York City. *Energy and the New York City Environment*. New York Council on the Environment of New York City, 51 Chambers St., New York, NY 10007. March 1974. 59 pp.

A comprehensive study of energy supply, use, and demand reduction methods. Its numerous recommendations cover everything from pricing policy to modification of building codes and transportation patterns to new energy regulation institutions. The report debunks the "myth" of a conflict between energy and environment.

94. New York Region. Regional Plan Association, Inc., and Resources for the Future, Inc. *Regional Energy Consumption: Second Interim Report*. Regional Plan Association, 235 East 45th St., New York, NY 10017. 1974. 47 pp.

This is the second in a series of reports resulting from a joint research project conducted by Resources for the Future and the Regional Plan Association under a grant from the Ford Foundation. The purpose of the project was to evaluate energy consumption trends and energy conservation opportunities in the New York region.

The first interim report, *Patterns of Energy Consumption in the Greater New York City Area*, published by Resources for the Future in July 1973, presented selected statistical data for an eight-county area of New York State. The second report expands the coverage to all 31 counties of the tristate New York—New Jersey—Connecticut region, provides data on some fuels that were not covered earlier, and refines many of the statistics. The report shows energy consumption for 1960 and 1970 (and, in many cases, for 1950 and additional years) broken down by energy type and consuming sector: residential, commercial and public facilities, industrial, and transportation.

95. Richmond, Virginia. *The Energy/Fuel Shortage and Land Development Trends in the Richmond Metropolitan Area*. Staff Research Report. Richmond Regional Planning District Commission, 701 E. Franklin St., Richmond, VA 23219. Feb. 1974. 34 pp.

This report presents the results of a survey of Richmond area land development firms and the effect of the energy shortage on their development plans. Many of the respondents indicated that the shortage would affect their development decisions with respect to location, types and site plans of housing, and related issues.

96. Tri-State Region (New York, New Jersey, Connecticut). *The Economics of Energy: Alternative Strategies for Conserving a Dwindling Resource*. Tri-State Regional Planning Commission, 100 Church St., New York, NY 10007. Feb. 1974. 15 pp.

The report surveys present trends of electric energy demand in the tristate region; extrapolates future demand; predicts future supply; indicates the likely gap between supply and demand; and concludes with suggested ways to conserve fuel and energy.

97. Washington, D.C., Area. *Energy Balance for the Washington Metropolitan Area for 1973*. Metropolitan Washington Council of Governments, 1225 Connecticut Ave., N.W., Washington, DC 20036. June 1973. 64 pp.

The purpose of this report is to provide a reference set of 1973 energy data so that energy issues facing the metropolitan Washington area can be discussed in quantitative terms. A framework of accounts used in the metropolitan energy balance is presented for each of the following headings: resource type, fuel type, method of conversion, energy use, and demand sector. A table by fuel type of nonrenewable and renewable primary energy resources used in the metropolitan Washington area is presented. Energy use data are presented in three demand sectors: commercial, industrial, and institutional; residential; and transportation. Energy use data are presented by fuel type and demand sector, using the following accounts: space heat, water heat, air conditioning, process, ground passenger transportation, ground freight transportation, and air transportation. A flow chart is presented showing how a metropolitan energy resources model is integrated into a metropolitan framework model used for forecasting the effects of alternative metropolitan management strategies over a specified planning record.

98. Washington, D.C., Area. *Energy, Land Use, and Growth Policy: Implications for Metropolitan Washington*. Second ed. Metropolitan Washington Council of Governments, 1225 Connecticut Ave., N.W., Washington, DC 20036. Aug. 1975.

This report analyzes the interaction of metropolitan land-use change and energy consumption by examining alternative development scenarios. Varying densities and spatial relationships are evaluated for their energy implications for the Washington, D.C., metropolitan area. Growth management issues raised by the analysis are discussed for their relevance to the metropolitan growth management process being conducted by the Council of Governments and its constituent local jurisdictions.

Part 7. Energy-Conserving Designs for Buildings and Sites

This section includes citations relating to the conservation of energy through various building and site design measures. Included are microclimate considerations; clustering of structures; performance standards in building codes aimed at energy conservation; building insulation measures; and the use of alternative energy sources.

99. *Amendment to the Uniform Building Code, 1973 Edition, Chapter 53, Energy Conservation and Thermal Insulation.* Aspen/Pitkin Planning Department, 130 S. Galena St., Aspen, CO 81611. 1975. 14 pp.

In 1974 Pitkin County, Colorado, initiated a study to determine methods to incorporate in building design and construction to encourage energy conservation. The results were released in January 1975 and incorporated in a building code amendment adopted in June, 1975. In addition the county has set up an advisory service through the building department to assist persons who design buildings to conserve energy by devising their own appropriate energy-saving techniques.

100. *Energy Conservation in Buildings: New Roles for Cities and Citizen Groups.* National League of Cities/U.S. Conference of Mayors, 1620 Eye St., N.W., Washington, DC 20006. Jan. 1975. 34 pp. $3.

This report is written especially for local government officials and members of community and consumer groups. It provides a general background to an increasingly important and money-saving aspect of energy conservation: using less energy in large buildings. This report is not a "how-to-do-it" manual but, rather, a discussion of some of the concepts with which local officials and consumers need to become familiar.

101. *Energy Crisis.* Conference transcript. Illinois Capital Development Board, 216 E. Monroe St., Springfield, IL 62701. June 1974. 370 pp. $6.50.

A regional conference on the energy crisis was held at McCormick Place, Chicago, on September 19—21, 1973, jointly sponsored by the states of Illinois, Indiana, Michigan, and Wisconsin. Its purpose was to search for operating, maintenance, and updating parameters to apply to existing buildings; to conserve all types of energy utilized within existing structures; to evaluate design criteria to reduce appreciably the energy consumption within new buildings; and to reduce constraints presently existing in zoning ordinances and building codes contributing to extravagant energy consumption.

102. *Environmental Considerations for the Site Plan Review Process in Land-Use Planning.* Broome County Department of Planning, P.O. Box 1766, Binghamton, NY 13902. April 1975. 78 pp.

This report advises local municipalities of the energy savings that can be attained through clustering, planned unit development, and orientation of buildings in accordance with microclimatic conditions.

103. Mills, Madolia Massey. *The Potential of Direct Solar Energy in Planning.* Exchange Bibliography 476. Council of Planning Librarians, P.O. Box 229, Monticello, IL 61856. Nov. 1973. 13 pp. $1.50.

This bibliography covers the literature dealing with the potential of utilizing direct solar heat in planning new cities and in redeveloping older urban areas.

104. *A Nation of Energy Efficient Buildings by 1990.* American Institute of Architects, 1735 New York Ave., N.W., Washington, DC 20006. 1974. 20 pp.

This report, developed under the coordination of the American Institute of Architects' Energy Steering Committee, is the second report on the AIA's effort to develop a national program for energy conservation in buildings. The report shows the financial feasibility of making both existing and new buildings energy efficient. It also outlines an administrative structure for the implementation of the program, which is aimed at attaining the greatest potential savings of energy offered by the built environment.

105. *National Plan for Solar Heating and Cooling (Residential and Commercial Applications): Interim Report.* U.S. Energy Research and Development Administra-

tion, Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830. March 1975. 119 pp.

This is an interim report on a comprehensive national plan for solar heating and cooling. The overall goal of the plan is to stimulate the creation of a viable industrial and commercial capability for producing and distributing solar heating and cooling systems, thereby reducing the demand on present fuel supplies through widespread use in residential and commercial buildings and applications. The plan calls for the demonstration of solar heating by the end of fiscal year 1977 and of combined solar heating and cooling by the end of fiscal year 1979. Also included are supporting research and development, collection and dissemination of information, and suggested government policy measures to accelerate implementation and market development. The solar heating and cooling activities described in this plan form a part of an overall national solar energy research, development, and demonstration program.

106. *Ordinance No. 475.* Cerritos City Planning Commission, 19400 Pioneer Blvd., Cerritos, CA 90701. June 5, 1974.

Ordinance No. 475 amends the Environmental Performance Standards of the Cerritos Municipal Code, incorporating a section of energy conservation in residential dwelling units. Its standards and requirements allow the maximum flexibility in the choice of materials, construction techniques, and design in order to encourage a reduction in energy consumption of up to 20 per cent for heating, cooling, and ventilation. In addition, design flexibility is encouraged, provided that alternative design solutions can be shown to produce equivalent amounts of energy savings. This ordinance applies to all new hotels, motels, apartment houses, lodging houses, dwellings, and all other residential buildings and additions to buildings.

107. *Oregon Alternative Energy Study.* Department of Urban Planning, University of Oregon, Eugene, OR 97403. 1975. 228 pp.

This report assesses information regarding the availability of alternative energy sources in Oregon and the process stages that make energy available for consumption by various users in the state. It also explores the economic, social, and environmental impacts associated with the location of energy delivery facilities.

108. *The Planning Document—Watonga, Oklahoma.* Center for Urban and Regional Studies, University of Oklahoma, 650 Parrington Oval, Norman, OK 73069. 1975. Var. pag.

The unique aspect of this planning document is that a major section of its Part III is devoted to planning for microclimate modification. Proposals are made to provide shelter belts, modify structural characteristics of the central business district, and alter the general urban form so as to modify dramatic changes in the climate of the urban area. This in turn should materially reduce the energy demands within urban communities and materially increase human comfort.

109. *Residential Energy Consumption: Single-Family Housing.* Report No. HUD-HAI-2. Prepared by Hittman Associates, Columbia, Md., for the U.S. Department of Housing and Urban Development, Office of the Assistant Secretary for Policy Development and Research. U.S. Government Printing Office, Washington, DC 20402. March 1973. 114 pp.

This is a report on ways to use residential energy more efficiently to obtain lower per capita consumption without modifying existing life styles. It concludes that up to a 40 per cent reduction can be achieved at a cost of about $1,000 per single-family housing unit.

110. Schoen, Richard, et al. *New Energy Technologies for Buildings: Institutional Problems and Solutions—A Report to the Energy Policy Project of the Ford Foundation.* Ballinger Publishing Co., 17 Dunster St., Cambridge, MA 02138. 1975. 217 pp. $12; $3.95 (paperback).

With commercial and residential building operation accounting for 40 per cent of all electricity consumed in the United States, efficient construction and building management techniques are among the most important elements in any long-range energy conservation program. This study offers evidence that employment of the techniques already available in these areas would dramatically reduce the growth of energy demand from new buildings as well as cut the primary energy requirements of existing structures. Beyond this, the authors provide an integrated discussion of technical, economic, and institutional barriers to the widespread implementation of new energy technologies—with particular emphasis on fuel cells, solar technology, and total energy systems. A detailed discussion of policy issues precedes their recommendations for change.

111. *Solar Heated Residence: Annual Research Report.* Colorado Springs Department of Public Utilities, P.O. Box 1103, Colorado Springs, CO 80947. July 1975. Pp. 135—144.

A gas moratorium in 1973 prompted the city of Colorado Springs to investigate alternate methods for space heating. This investigation led to the conclusion that solar heating could become a viable alternative. The city and the American Institute of Architects, the Professional Engineers of Colorado, the Clearing House Association of Banks in the Colorado Springs area, the Homebuilders' Association, and interested individuals joined forces to form a community laboratory to construct and test a solar heated house. This house is better known as the Phoenix Project and is located in the northeast section of the city. The report is the result of one year's intensive investigation into four areas related to solar

heating: technical research on the system's components; economic research; legal research on zoning ordinances and building codes; and research on the social acceptance of solar heating.

112. Steadman, Philip. *Energy, Environment, and Building*. Cambridge University Press, 32 E. 57th St., New York, NY 10022. 1975. 287 pp. $14.95.

This book surveys methods for the conservation of energy in buildings and new sources of energy for buildings, as well as ways in which buildings can be designed so as to have a less destructive impact on the natural environment. It covers the following subjects: means for energy conservation in otherwise conventionally designed buildings; solar energy and its use for space heating and cooling, for water heating, and for the generation of electricity at building scale through the use of photoelectric cells; the small-scale use of wind and water power; the treatment of building wastes by composting, with the production of methane as a fuel through the anaerobic digestion of organic matter; and the conservation of water in buildings.

The book sets out the basic physical and biological principles involved, but without assuming special technical knowledge on the part of the reader. A short history of experiment and past developments is included for each of the areas covered. It is then shown how these principles can be applied in building design, with illustrations drawn from actual projects. There are detailed lists of buildings, manufacturers of equipment (e.g. windmills, solar heaters), and information sources, and extensive bibliographies. The scope of the work reviewed is worldwide, but emphasis is placed especially on the United States, where the most practical experiments have been carried out.

113. Stein, Richard G. "Architecture and Energy" *Architectural Forum*, Vol. 134, No. 1 (July-August 1973). Pp. 38—58.

An analysis of the energy situation and a detailed report on actions that can be taken in building design and technology to reduce energy demands. Under "Architectural Aspects," such issues as energy changes during a building's life, tall buildings, structure types, lighting, electric heating, the mechanical plan, and ventilation are discussed.

114. Tompkins, Dorothy Campbell. *Power from the Earth: Geothermal Energy*. Public Policy Bibliographies: 3. Institute of Governmental Studies, University of California, Berkeley, CA 94720. 1972. 29 pp. $2.50.

The interest in geothermal resources as a potentially vast reservoir of energy led to the compilation of this bibliography. It covers post-1965 materials in public administration, water resources, engineering, and earth sciences relating to the United States.

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